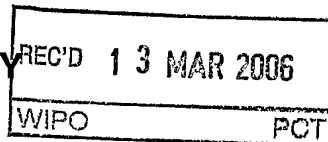# PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 101268a/ubr/mdj	FOR FURTHER ACTION	See Form PCT/IPEA/416

International application No. PCT/EP2004/000205	International filing date *(day/month/year)* 14.01.2004	Priority date *(day/month/year)* 14.01.2004

International Patent Classification (IPC) or national classification and IPC

H04L12/56

Applicant

TELEFONAKTIEBOLAGET LM ERICSSON (PUBL)

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 7 sheets, including this cover sheet.

3. This report is also accompanied by ANNEXES, comprising:

   a. ☒ *sent to the applicant and to the International Bureau)* a total of 5 sheets, as follows:

   ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).

   ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.

   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

   ☒ Box No. I   Basis of the opinion

   ☐ Box No. II   Priority

   ☐ Box No. III   Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

   ☐ Box No. IV   Lack of unity of invention

   ☒ Box No. V   Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

   ☐ Box No. VI   Certain documents cited

   ☐ Box No. VII   Certain defects in the international application

   ☐ Box No. VIII Certain observations on the international application

Date of submission of the demand 11.11.2005	Date of completion of this report 14.03.2006
Name and mailing address of the international preliminary examining authority: European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer Lamadie, S Telephone No. +31 70 340-4477

Box No. I   Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:

       ☐ international search (under Rules 12.3 and 23.1(b))
       ☐ publication of the international application (under Rule 12.4)
       ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-18   as originally filed

   Claims, Numbers

   1-25   received on 11.11.2005 with letter of 11.11.2005

   Drawings, Sheets

   1/8-8/8   as originally filed

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
       ☐ the description, pages
       ☐ the claims, Nos.
       ☐ the drawings, sheets/figs
       ☐ the sequence listing *(specify)*:
       ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
       ☐ the description, pages
       ☐ the claims, Nos.
       ☐ the drawings, sheets/figs
       ☐ the sequence listing *(specify)*:
       ☐ any table(s) related to sequence listing *(specify)*:

     ***   If item 4 applies, some or all of these sheets may be marked "superseded."***

Box No. V   Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	3,4,6-13,15,16,18-25
	No:	Claims	1,2,5,14,17
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-25
Industrial applicability (IA)	Yes:	Claims	1-25
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document:
D1:   US 2003/112756 A1 (LE GOURIELLEC LOUIS ET AL) 19 June 2003 (2003-06-19)

1.   The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1, 5, 14 and 17 is not new in the sense of Article 33(2) PCT.

1.1. Concerning claim 1:
Document D1 discloses (the references in parenthesis applying to this document):
    a method of controlling a queue buffer arranged to queue data units received over a communication network (page 2 column 2 paragraph 0029), comprising:
    invoking a congestion notification procedure under a predetermined condition (page 3 column 1 paragraph 0039: marked data units are dropped, unmarked data units are sent and prevented from being dropped),
    characterized in that said congestion notification procedure comprises determining whether one or more of said queued data units contains a predetermined information (page 2 column 2 paragraph 0029: unmarked data units prevents the data units from being dropped), and if no queued data units contain said predetermined information, performing a congestion notification with respect to one or more queued data units (page 3 column 1 paragraph 0039: all marked data units are dropped), and if one or more queued data units contain said predetermined information (unmarked data units), preventing a performance of a congestion notification at least with respect to said data units containing said predetermined information (page 3 column 1 paragraph 0039: the unmarked CR traffic is not dropped).

The subject-matter of independent claim 1 is therefore not new (Article 33(2)

PCT).

1.2. Concerning claim 5:
The document D1 discloses (the references in parentheses applying to this document) a method of controlling a data unit sender for sending data units over a communication network (page 2 column 2 paragraph 0028: ingress node), said data unit sender being arranged for detecting congestion notifications for said data units (figure 12 and page 3 column 1 paragraph 0039: in case of congestion marked data units are dropped and unmarked data units are prevented from dropping), said method comprising:
determining whether one or more data units of a flow of data units fulfils a congestion notification prevention condition (page 3 column 1 paragraph 0039: unmarked packets are prevented from being discarded), and
if said one or more data units of said flow fulfil said congestion notification prevention condition, setting predetermined congestion notification prevention information in at least said one or more data units of said flow (page 3 column 1 paragraph 0039: all unmarked traffic remains unmarked thereby notifying to the next switch that it is prevented from dropping).

The subject-matter of independent claim 5 is therefore not new (Article 33(2) PCT).

1.3. The subject-matter of independent claims 14 and 17 corresponds, in terms of a controller, to the subject-matter of method claims 1 and 5.

Therefore, based on the same reasons as in 1.1. and 1.2. above, claims 14 and 17 also lack novelty.

2. Dependent claims 2-4, 6-13, 15, 16, 18-25 do not contain any features which, in combination with the features of any claim to which they refer, appear to meet the requirements of the PCT in respect of novelty and/or inventive step.

3. Further comments:

3.1. It is pointed out that the term "congestion notification" is not synonym to "explicit congestion notification", and that as already acknowledged in the application on description page 3 lines 22 to 24 and claim 2, **dropping data units as a reaction**

to congestion is also a way of notifying congestion.
Therefore document D1 by dropping packets exceeding a predetermined allowed bandwidth during congestion and preventing other packets from being dropped, indirectly notifies the sources using excessive bandwidth of a congestion.

3.2. Furthermore it is remarked that connection oriented networks also implement congestion notification procedures (ATM with ABR flow, Frame relay with BECN, TCP with ACK).

3.3. Concerning the aspect that in D1 data units are first distinguished between marked and unmarked before queuing, whereas in the application the data units are first queued, and then checked for a predetermined information.

The two solutions solve the same problem of avoiding the dropping of the units containing the predetermined information (unmarked packets) and notifying the sender of a congestion through the dropping of the units not containing the predetermined information (marked packets).
Using any of the two solutions is a matter of obvious selection among two possibilities, without involving any inventive step.

In fact the solution developped in D1 could even present the advantage that the data units are first checked for the predetermined condition avoiding to enqueue the units that deserve to be dropped, whereas in the application the units are first queued, then the predetermined condition is checked for, and then some of the enqueued data units are dropped.

3.4. Finally concerning the fact that in D1 **marked packets are subject to congestion notification** (dropping packets is one form of congestion notification), whereas in the Application **marked data units are prevented from congestion notification**.

it is stressed that if all packets that should be dropped are marked, by default **all unmarked packets are prevented** from being subject to a congestion notification, and the system of D1 for performing said prevention is forced to check the presence or absence of the marking bit in the data units.
Therefore the absence of marking in a data unit is considered as being the predetermined condition contained in the data units for preventing a performance of a congestion notification in the sense of independent claim 1.

3.5. Concerning claims 5 and 17: the term "a data unit sender, for sending data units" could refer to any equipment within the network able to send data units further away, and is not limited to the data unit source.

3.6. Contrary to the description on page 4 lines 1 to 31, there is no hint in the independent claims that the congestion notification prevention condition is set by a data unit source for avoiding an unneccessary launching of the congestion notification procedure in cases where a flow is coming to an end or when the source is application limited.

PCT/EP2004/000205   101268 q8
Telefonaktiebolaget LM Ericsson   November 11, 2005

Claims

1. A method of controlling a queue buffer arranged to queue
   data units received over a communication network,
   comprising:
   invoking a congestion notification procedure (S3) under
   a predetermined condition (S1, S2),
   characterized in that
   said congestion notification procedure (S3) comprises
   determining (S31) whether one or more of said queued
   data units contains a predetermined information, and if
   no queued data units contain said predetermined
   information, performing (S32) a congestion notification
   with respect to one or more queued data units, and if
   one or more queued data units contain said predetermined
   information, preventing a performance of a congestion
   notification at least with respect to said data units
   containing said predetermined information.

2. The method of claim 1, wherein said performing of said
   congestion notification with respect to a given data
   unit comprises one of dropping said given data unit and
   marking said given data unit with a congestion notifier.

3. The method of claim 1 or claim 2, wherein if one or more
   queued data units contain said predetermined
   information, performance of congestion notification with
   respect to any queued data units is prevented.

4. The method of claim 1 or claim 2, wherein if one or more
   queued data units contain said predetermined
   information, performance of congestion notification with
   respect to all data units belonging to a same flow as

said data units containing said predetermined information is prevented.

5. A method of controlling a data unit sender (52) for sending data units (54) over a communication network (3), **said data unit sender being arranged for detecting congestion notifications for said data units, said method** comprising:
determining (S21) whether one or more data units of a flow of data units fulfils a congestion notification prevention condition, and
if said one or more data units of said flow fulfil said congestion notification prevention condition, setting (S22) predetermined congestion notification prevention information in at least said one or more data units of said flow.

6. A method according to claim 5, wherein said step (S21) of determining whether a congestion notification prevention condition is fulfilled comprises the analysing of higher layer information.

7. The method of claim 5 or 6, wherein said congestion notification prevention condition comprises that the flow is coming to an end.

8. The method of one of claims 5 to 7, wherein said congestion notification prevention condition comprises that said flow is application limited.

9. The method of one of claims 5 to 8, wherein said congestion notification prevention condition comprises that said one or more data units of said flow carry predetermined signalling identifiers.

10. The method of one of claims 5 to 9, wherein said data unit sender (52) is part of a proxy server (46).

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11.   The method of claim 10, wherein said proxy server (46)
      is connected to a mobile communication network (41) and
      arranged for receiving data units from a sending end
      point (47) outside of said mobile communication network
      (41) and relaying said data units to a receiving end
      point (43) connected to said mobile communication
      network (41).

12.   The method of one of claims 5 to 11, wherein said
      predetermined congestion notification prevention
      information is a single bit.

13.   The method of one of claims 5 to 11, wherein said
      predetermined congestion notification prevention
      information is a data unit count-down value that counts
      down the number of data units remaining in the flow.

14.   A queue buffer controller (10) for controlling a queue
      buffer (20) arranged to queue data units (30) received
      over a communication network (3), comprising:
      a congestion notifier (103) for invoking a congestion
      notification procedure under a predetermined condition,
      characterized in that
      said congestion notifier (103) comprises a part (1031)
      for determining whether one or more of said queued data
      units contains a predetermined information, and if no
      queued data units contain said predetermined
      information, for performing a congestion notification
      with respect to one or more queued data units, and if
      one or more queued data units contain said predetermined
      information, for preventing a performance of a
      congestion notification at least with respect to said
      data units containing said predetermined information.

15.   The queue buffer controller of claim 14, wherein said
      part (1031) of said congestion notifier (103) is

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arranged to prevent performance of congestion
notification with respect to any queued data units if
one or more queued data units contain said predetermined
information.

16. The queue buffer controller of claim 14, wherein said
part (1031) of said congestion notifier (103) is
arranged to prevent performance of congestion
notification with respect to all data units belonging to
a same flow as said data units containing said
predetermined information if one or more queued data
units contain said predetermined information.

17. A controller (51) for controlling a data unit sender
(52) for sending data units (54) over a communication
network (3), **said data unit sender being arranged for
detecting congestion notifications for said data units,
said controller** comprising:
an element (510) for determining whether one or more
data units of a flow of data units fulfils a congestion
notification prevention condition, and if said one or
more data units of said flow fulfil said congestion
notification prevention condition, for setting
predetermined congestion notification prevention
information at least in said one or more data units of
said flow.

18. The controller (51) according to claim 17, wherein said
element (510) for determining whether a congestion
notification prevention condition is fulfilled,
comprises an element for analysing of higher layer
information.

19. The controller of claim 17 or 18, wherein said
congestion notification prevention condition comprises
that the flow is coming to an end.

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20. The controller of one of claims 17 to 19, wherein said congestion notification prevention condition comprises that said flow is application limited.

21. The controller of one of claims 17 to 20, wherein said congestion notification prevention condition comprises that said one or more data units of said flow carry predetermined signalling identifiers.

22. The controller of one of claims 17 to 21, wherein said data unit sender (52) is part of a proxy server (46).

23. The controller of claim 22, wherein said proxy server (46) is connected to a mobile communication network (41) and arranged for receiving data units from a sending end point (47) outside of said mobile communication network (41) and relaying said data units to a receiving end point (43) connected to said mobile communication network (41).

24. The controller of one of claims 17 to 23, wherein said predetermined congestion notification prevention information is a single bit.

25. The controller of one of claims 17 to 23, wherein said predetermined congestion notification prevention information is a data unit count-down value that counts down the number of data units remaining in the flow.

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